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Community Building through Online Social Networks: Evolution and Engagement

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Abstract

Using theories of social capital and social networks, this research explores the role of online social network structure for facilitating collaborative civic engagement in the context of an Australian government-sponsored online discussion forum for community building. It argues that where social capital is at the currency of today's society and Web 2.0 era, social networks hold the reserves of that currency. Comparing results from the sociocentric network analysis of communication ties between the early years and current year demonstrate that there is no significant difference in the intensity of communication amongst participants (density) and the tendency for network communications to focus on particular individuals or groups (centralisation). This implies that the provision of technological infrastructure alone is not sufficient. Rather, for long-term sustainability, government agencies need to understand the impact of virtually based community versus physically based communities towards civic engagement.

Keywords

Online social networks, social capital, community building, discussion forum, civic engagement

INTRODUCTION

Traditional studies on social capital have sought to understand the effects of online or virtual communities on networks, norms and trust that constitute social capital (Putnam, 1995; Blanchard & Horan, 1998). With the advent and constant evolution and application of interactive Web2.0 technology, online social media (e.g. Facebook, mashups) have fostered development and maintenance of online social networks (OSN) (Ellison et al., 2007; Smith, 2008; Phulari et al., 2010). OSN may be viewed as a paradigm shift for change towards new forms of public platforms that are more accessible and more inclusive to the public who are willing to add value to public policy and community building. However, research on OSN is still relatively new and a review of the literature finds lack of conceptual and empirical research on the potential role of OSN in community building (Leskovec et al., 2008). Moreover, the effect of the structure of OSN on how communities evolve over time is an interesting topic that requires significant attention (Newman, 2003; Leskovec et al., 2008). Such understanding is crucial for understanding social and organizational outcomes such as knowledge exchange, disaster management, group dynamics and so on.

Building on traditional studies of social capital and civic engagement set by Putnam (1995) and Blanchard & Horan (1998), the overarching goal of this research paper is, therefore, to examine the structure of OSN to understand emerging citizen online communication and engagement patterns, using longitudinal data collected from a case study of Australian state government initiated OSN for voluntary citizen engagement towards community building. The motivating questions for the research are as follows: (1) Can OSN contribute to community building, civic, cultural engagement & therefore address the democratic deficit? (2) If so, what kinds of OSN structures are emergent or conducive to community building and civic engagement? Are denser networks indicative of higher levels of civic engagement? and (3) How can we measure civic and cultural engagement in the form of social capital in the context of OSN?

The remainder of this paper is structured as follows: the next section presents a literature review of the role of social capital theory in understanding civic engagement; online social networks; and impact of OSN on community building. The section following describes our research methodology on a single site case study using sociocentric network analysis and qualitative interviews. The subsequent section presents the discussion followed by conclusion and limitations of this research.

THEORETICAL FRAMEWORK

Social Capital and Community Building

In order to understand what facilitates exchange and what factors are conducive to citizen engagement, contribution and sanctions within a body of norms and policies acceptable in the public sphere, it is useful to consider social capital as a theoretical perspective. It is also useful to pose the question – what factors promote civic engagement? Are these factors purely individual-motivated or socially-motivated? Take for instance the sense of belonging to a family, a community, or a professional association. The very fact that the social fabric within which we are embodied in has many benefits for us as individuals and communities. In a seminal paper, Coleman (1988) describes a classic example of trading in the diamond market in New York where bags of diamond often worth thousands of dollars were exchanged amongst merchants frequently to other merchants for them to inspect at their own leisure. Considering that this was done without any formal insurance, an objective observer might think it to be risky as there could potentially be risky with the opportunism for fraud and theft. However, the market was extremely successful and efficient. Coleman argued that the market worked because of closeness, high degree of trust and trustworthiness amongst the merchants; thus attributing the success of the markets to high levels of social capital.

According to Coleman (1988, p. 96), “social capital is defined by its function. It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors – whether persons or corporate actors – within that structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that in its absence would not be possible.” Similarly, Bourdieu (1992, p. 119) defines social capital as “the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalised relationships of mutual acquaintance and recognition. Acknowledging that capital can take a variety of forms is indispensable to explain the structure and dynamics of differentiated societies.” While there are other important influential scholars in social capital and social trust (often measured as trust between strangers) (Putnam, 1995), (Fukuyama, 1995), (Burt, 2005), it can be generally accepted that social capital is composed of a network; a cluster of norms, values and expectancies that are shared by group members; and sanctions – punishments and rewards – that help to maintain the norms and network (Halpern, 2005).

In the context of the relevance of social capital to civic engagement between community, citizens and the government, Putnam's (1993) classical study of social capital in regions of Italy cannot be overlooked. In this study, Putnam contrasted the relationship between social capital in the northern and southern regions of Italy. The northern region comprised of vibrant communities where social ties were dense and social trust was high. The social capital of the southern region on the other hand was heavily influenced by the hierarchical structure of the Catholic church, which was not conducive towards social trust and community building. The core finding from this study was that the high levels of social capital found in the northern regions was associated with a more effective and trusted government, where the constitutional arrangements for all regional governments remained the same. Conversely, more detailed research on the relative performance of the post-Soviet nations and on the failures of government within many African nations reveal a similar but inverse association between weak social capital and poorly performing government institutions (Halpern, 2005). Therefore, communities that thrive on free and open channels of exchanges and network structures that are non-hierarchical, de-centralized and in an egalitarian form with the government are ones that are able to generate higher levels of social capital. Examples of mechanisms that may encourage such engagement include government's encouragement of citizens' contribution such that it matters more; deliberative polls; citizen juries; involving random selection of the public for consultation for an important public issue; and community forums. Thus, with the current technological advances such as the use of Web 2.0 media, online social network platforms are instrumental in promoting civic engagement that allows for bridging of social capital across geographical, organizational, hierarchical, temporal and spatial barriers. In the sections that follow, the notions of social networks and how online media enables it for civic engagement is discussed.

Social Networks and Online Media

A social network is a set of actors and relations that hold the actors together. Actors can be individuals or aggregate units such as departments, organizations, or families. Actors exchange one or many resources with each other. Such resources include data, information, goods and services, social support or financial support. These kinds of resource exchanges are considered a social network relation, where individuals who maintain the relation are said to maintain a tie (Emirbayer, 1997). The strength of their tie may range from weak to strong, which depends on the number and types of resources they exchange, the frequency of exchanges and the intimacy of the exchanges (Marsden and Campbell, 1984). Further, social ties consist of multiple relations (e.g. in the case of doctors who have a doctor-patient relationship as well as a friendship relationship) and therefore, are called “multiplex ties” (Haythornthwaite, 2002).

The study of social networks can be regarded as a disciplined inquiry into patterning of relations among social actors and among actors at different levels of analysis (Breiger, 2004). In this paper, the central tenet for the study of social networks is that network structure and position have important behavioral, perceptual and attitudinal consequences for both individual units and for the system as a whole (Knoke & Kulinski, 1992). Thus, the analysis of social networks or SNA plays a vital role in exploring the patterns of interaction between individuals or groups, including its properties, such as the cohesiveness of the individuals, the number of relationships (ties), the number and quality of informal subgroups (cliques), information brokers (those who contribute to information transitivity) and bottlenecks (those who hinder information transitivity).

Online Social Network Relations & Ties

With the advent of Web 2.0 technologies such as Facebook, LinkedIn & YouTube, the second order effect of information and communication technologies (ICT) allows for individual and organizational form of communication to traverse spatial, organizational, structural and temporal barriers (Hinds & Kiesler, 1995). Personal relations these days are no longer conducted face-to-face only. The revolution of technology and internet means that the entire communication environment has taken on a virtual dimension. ICTs now supplement and have sometimes even replaced traditional resources (e.g. town-hall style community meetings) for developing an actor's social network (Nardi et al., 2000). In fact, several scholars note that people who use ICT mediums such as computer networks and the internet for communication and collaboration are thus engaging in social relationships with each other (Wellman, 1996; Katz & Rice, 2002). Thus, personal networks not only shape ICT for communication, but ICT means are also shaping personal networks and re-drawing social boundaries. In fact, network scholars claim that with online social networks, there exist a multiplex character of personal networks, which tend precisely to intersect several social relations (Licoppe & Smoreda, 2005).

Haythornthwaite (2002) claims that the potential for ICT such as email or online social network forums, when used to initiate a new contact suggests another type of tie called "latent tie", which is a tie for which a connection is available technically but that has not yet been activated by social interaction. Such ties come into existence through the structures established by formal means (eg. management of an organization). For example, the NSW Community Capacity Building Forum in Australia encourages community members to use its online discussion forum to post messages and seek advice from other community members on diverse subjects, as a result of which latent ties may be formed, developing to weak (when members acquaint with one another) and eventually to strong ties (when they become close friends over time). Actors in a strong tie relationship enjoy the introduction of new ICT mediums because the new mediums supplements existing ones and in turn fosters strengthening the tie, whereas actors in a weak tie relationship also benefit positively in that opportunities to connect to unconnected actors are now introduced. This is especially fruitful for bridging social capital. Weakly-tied actors however, are driven by the available forms of mediums and the norms influencing its use. For example, in an organization, if management norm is that employees should use the online discussion forum to exchange information, then the employees bound by weak ties with other employees will tend to use the discussion forum. However, removal of such a medium will usually mean that the weakly tied actors become even more distant, leading to tie decay.

Apart from the strength and multiplex nature of ties, OSN supports any network form involving one-few-many to many-few-one. It overcomes spatial, temporal and organizational hierarchical barriers (Hinds & Kiesler, 1995; Kiesler & Cummings, 2002). Therefore, with a flatter form of communication, communication structures become more decentralized (Hinds & McGrath, 2006). Information sharing, use, and communicating with others can be performed at little financial or social costs compared to the traditional brokering needed in unmediated personal relationships. Online community identities can be used to quickly introduce, assist, and socialize new participants, as well as sustain participation over time. In other words, it allows for the creation of latent ties which would not have been possible through physical means. Such advantages translate to increase in users and denser communication within OSNs.

In light of the above arguments, it can thus be postulated:

Proposition 1 (P1): The number of actors in a communication network will increase over time in an online social network for community building

Proposition 2 (P2): The density of communication ties will increase over time in an online social network for community building

Proposition 3 (P3): The extent of centralisation of an online communication network will become more decentralized over time in an online social network for community building

METHODOLOGY

Context of Study

The context of study is the New South Wales (NSW) Community Builders discussion forum which is part of the initiative for the community capacity building programme by the NSW government of Australia (NSW Community Builders, 2010). The motivation for the discussion forum stems from a genuine stimulus by the government to engage citizens across various communities, professions and cultures in a diverse array of topics ranging from health to finance, from profit to not-for-profit organizations and from funding requests to governmental policy issues. Although this is a governmental initiative and the infrastructure is funded and owned by the government (Department of Human Services), the real community building is based on participation of people, individually and as a community, who act together to create change. It incorporates many concepts including community renewal, social capital, community diversity and sustainability. As such, it has attracted a large number of audience as well as contributors to the forum from local and Indigenous Australians to Australians who work and live abroad. Discussion topics may range from requests by a government agency or officer asking the public for a review of policy updates to the owner-builder legislation, or requests for help with funding from the government to cover family-related expenses such funeral costs for a single mother, and so on. Originally deployed in February 1999, the forum has captivated a large audience and has been very active with a large number of well-meaning contributions from Australian citizens and residents alike. The main advantage of the forum is that it allows for cross-traversal of organizational and bureaucratic barriers such that the flow of communication within this public sphere is from government-to-government, government-to-citizen, citizen-to-citizen, and citizen-to-government (G2G, G2C, C2C, C2G). Since 2001 to September 2010 (the time the research was undertaken), the forum has had approximately over 2,028 unique contributors to date and about 3,598 posts over 676 topics (according to the data provided by the forum online). Whether this represents a growth or a surge in public engagement or not through the online discussion forum is unclear, but this at least provides some form of an exploratory and more importantly empirical indicator of the intensity of engagement; and in the words of the NSW community builder's editorial department, the number of visitors to the site itself represents a success measure. For these reasons and the advantage outlined above, the NSW community builders discussion forum makes an interesting case study for the purpose of this research.

Case Study & Social Network Analysis

The primary methodology utilized in this research is that of a case study. Firstly, the study is exploratory because it attempts to unravel information in order to form a richer picture of citizen and civic engagement as a result of a government-provided IT (online social network) architecture and infrastructure. To re-iterate, one of the main research questions is to understand what kinds of network structure emerge from an online social network that allows for the further understanding of civic engagement within the public sphere. Also, given that the researcher has no control over behavioural events and that the degree of focus is on contemporary events through a direct observation and systematic evaluation of the interactions and communication flow between the forum participants, the choice of a case study is ideal (Yin, 2009).

In terms of data collection and analysis, a triangulation of quantitative and qualitative method is utilised. Social network analysis is utilised as the primary method for capturing and analyzing relational data apart from attribute data (as in most social science surveys and research). In particular, a sociocentric approach for collecting data is adopted where the focus is on measuring the structural patterns of interactions and how those patterns explain outcomes, such as intensity of engagement in the form of density of communication within the network and clique formations (Chung et al., 2005; Hossain et al., 2007). The underlying assumption is that members of a group or community would interact more than a randomly selected group of similar size. In keeping with this assumption, the choice of a sociocentric network approach is ideal here because the collection of actors and their interactions with other actors in the form of message-postings is readily available within the context of the online discussion forum. Furthermore, this approach remains the gold standard because of its ability to gather data for the entire network where the actors are a priori defined and the network represents the saturation sample of interest and the analysis allows for the results to be generalized to the population. Therefore, the community builder forum represents the sampling unit and the participants of the discussion forum (their ties or their communication in the form of message posting) are regarded as the observation unit. A qualitative in-depth interview followed after social network analysis in order to better understand and form a richer meaning of the level and structure of online interactions.

Quantitative Data Collection

Data for the study was extracted directly via the threads (or topics) in the forum at the NSW Community Builders website using a three-phase process in chronological order from the earliest post (2001) to the most current post (2010):

Collection of node-level data: For every individual who posted a message on the forum, his or her unique identifier (login) was extracted. Every effort was made to ensure that the identifier was unique as there were circumstances where some identifiers belonged to the same person (as identified from the content of the post). For instance, “BarryJ” who posted a message in thread topic #1 may also have posted in another thread with the identifier “BarryJones”. In such circumstances, one of the identifiers to denote both “BarryJones” and “BarryJ” was used.

Collection of tie-level data: For every discussion topic, every posting between the sender and receiver were extracted. For the purpose of our study, a tie here is defined as a message posted between one person to another person, or a message posted to the public within the forum. An example of the latter is usually the first post within the discussion topic where an individual posts a message requesting for further information or to bring to the attention of the public regarding some specific information. In such an example, there may be none who reply, or one or many who may reply to the thread. In the case where an individual posts a message and no one has replied to it, the tie is coded as ‘ “sender” to “NA” ’, where NA represents the fact that no one has replied. In the actual data analysis, these ties are discarded for the analysis (but the actors are not, which is why in a sociogram, they would appear as isolates). Another variation considered is that an individual may reply to at least more than once to the same others either within a particular topic or other ones. In these cases, their postings by frequency were summed up. E.g. Actor i may have replied to actor j 10 times across a single topic or across multiple topics within a given time frame. This value is captured as the frequency of communication, which is regarded as tie strength. Obvious by now, the tie data is directional.

Collation of node-level and tie-level data: Once the node-level and tie-level data is extracted in a spreadsheet, the entire data set is then collated to form the VNA file - the standard input file used to draw the sociogram in Netdraw and UCInet, network level statistics are then computable (Borgatti et al., 2002).

Measures

The following section provides an overview of the network-level measures used in this study.

Network Density: Network density basically represents the actual number of ties in a network as a ratio of the total maximum ties that are possible with all the nodes of the network. A fully dense network has a network density value of 1, which indicates that all nodes are connected to each other. A network with a density value near 0 indicates that it is a sparsely knit network. Hence, *density* is a measure of network cohesiveness. For a directed graph with n nodes, density D is defined as:

$$D = \frac{\sum_{i,j=1}^n x_{ij}}{n(n-1)}$$

where x_{ij} is the value of the connection from i to j

Local Centrality and Global Centrality: Local centrality measures the number of direct ties that a particular node has, whereas global centrality measures indirect ties as well (i.e. ties that are not connected directly to that node). This said, a node that lies at a short distance between many other nodes is considered as ‘close’ to many other nodes in the network (also termed as ‘closeness’). Freeman (Freeman, 1978) has proposed the measure of relative centrality to measure the centrality of a node with respect to the overall centrality of the other nodes in the network. His significant contribution in this field has enabled social network analysts to measure the node-centrality on a weighted basis which can be easily compared within the entire network. In mathematical terms degree centrality, $d(i)$, of node i is defined as:

$$d(i) = \sum_j m_{ij}$$

where $m_{ij}=1$ if there is a link between nodes i and j , and $m_{ij}=0$ if there is no such link.

Centralisation: Centralisation and density are not only important measures in SNA, but they are also complementary to each other. Density explains the general level of connectedness in a network. Centralisation explains the extent to which the connectedness is focused around a particular node. To measure centralisation in a network, we need to observe the differences in the centrality values of the most central nodes and all the other nodes. Then, to arrive at the centralisation value, we calculate the ratio of the sum of actual differences and the sum of the maximum possible differences. Centralisation is thus defined as:

$$r = \frac{\sum_{i=1}^g [\max(D_i) - D_i]}{(g-1)(g-2)}$$

where D_i is the number of people in the network that are directly linked to person i . The number of actors is represented by g in this equation.

RESULTS

The results are summarised in Table 1 below showing the network measures of density and centralisation for all of the interactions taking place during 2001-2010 (i.e. since the forum's inception to date); for all of the interactions taking place during the first year since inception March 2001 – February 2002; and for all of the interactions taking place during the most recent year to date (March 2009 – February 2010). Although data is available until October 2010, the time-period March – February was used for the sake of consistency in time-period comparisons. However, data for the 1999-2000 period was not available through the forum so the data collected from periods 2001-2002 (from the earliest available) was used.

Table 1: Network measures of Density & Centralisation for 2001-2010, 2001-2002 and 2009-2010		
Year	Network Measure	Network Measure Value
2001-2010	Network Centralisation (outdegree)	0.409%
(number of actors: 2036	Network Centralisation (indegree)	0.562%
number of messages: 1450)	Density	0.0007 (<i>std. dev.</i> = 0.0301)
Mar 2001 – Feb 2002	Network Centralisation (outdegree)	1.652%
(number of actors: 177	Network Centralisation (indegree)	5.629%
number of messages: 253)	Density	0.0067 (<i>std. dev.</i> = 0.0857)
Mar 2009 – Feb 2010	Network Centralisation (outdegree)	0.637%
(number of actors: 139	Network Centralisation (indegree)	2.305%
number of messages: 151)	Density	0.0065 (<i>std. dev.</i> = 0.0939)

Briefly, the results indicate that for the period 2001 – 2010, the cohesiveness or the level of intensity of interaction *between* actors (or participants) is quite low (density value = 0.0007). In other words, for the number of maximum possible interactions given the number of participants (2,036), the number of existing interactions is quite low. In other words, the network is quite sparse, indicating that communication between members of the forum is quite low. Furthermore, the network centralisation for both outdegree (i.e. the number of posts made in the entire network) - 0.409%, and indegree (i.e. the number of posts received in the entire network) – 0.562% taken together indicates that the network is reasonably centralised with only a few participants (relative to the entire number of 2,036 participants in 2001-2010) making the effort to communicate with other participants across diverse topics. This suggests that there may be a form of hierarchy observed in the network over the 10 year period. In other words, the communication is channelled towards and from certain individuals or key actors within the network. Conjectures of such actors include the forum moderator, community leaders, etc. The following figure shows the sociogram for the period 2001-2010. For privacy reasons, the names and identity of the individuals have been suppressed.

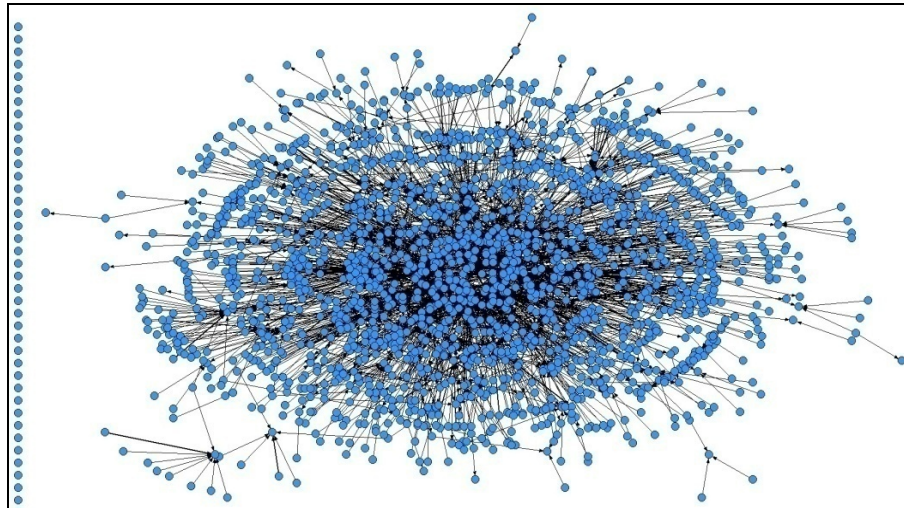


Figure 1: Sociogram showing communication network from 2001 - 2010

During the period February 2001 - March 2002, there were 177 active actors, 253 message postings across 31 topics. The density value for the network during this period is 0.0067, which indicates that the network is not tightly-knit. The thickness of the lines indicates the strength of the tie (or the frequency of communication). For this period, the highest value for tie strength was 4 and lowest was 0. Six isolated actors are identified in the upper left corner of the sociogram. This indicates actors who posted a message but never received a reply from anyone.

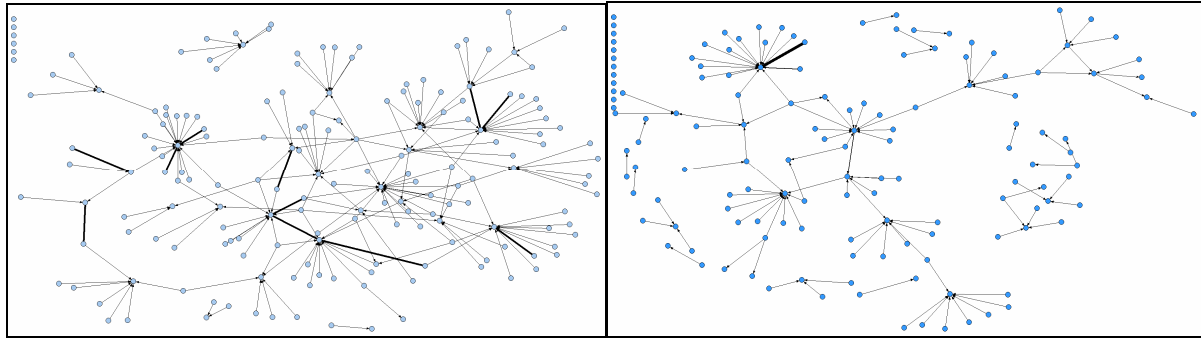


Figure 2: Sociogram showing communication network from March 2001 – February 2002 (left) and March 2009 – February 2010 (right)

For the period March 2009 – February 2010, there were 139 active actors, 151 message postings across 59 topics. The density of the sociogram for this period is 0.0065, which again indicates that the network communication is quite sparse amongst the active actors. The highest tie strength (frequency of communication) recorded was 7 and minimum was 0. There are 12 isolated actors in this period. Visually inspecting the sociogram shows that there are indeed only a few actors who are communicating across different subgraphs or topics without whom the entire sociogram would be comprised of various unconnected subgraphs.

In contrast to the earlier period, the density value of the previous network is slightly lower which is also evidenced in the interconnectedness of the nodes within the network. The thickness of the lines in the previous sociogram also shows the intensity of communication amongst several actors in contrast to the fewer intensity in sociogram for the period March 2009 to February 2010.

DISCUSSION

This research has investigated the evolution of a government supported OSN and associated it with the engagement of citizens as part of the NSW Community Building programme in Australia. The paper empirically analysed the evolution of the online community network during its early, current and cumulative growth periods. It used social network analysis to understand the intensity of communication (density) and whether such communication is structured around a certain hubs (centralisation), which can be an individual or a collective group of individuals.

The first proposition (P1) addressed the increase in participant numbers over time. It was surprising to note that out of a cumulative of 1450 interactions by 2036 unique participants, the number of postings and participants decreased in stark contrast to the early and later years. In particular, in 2001 – 2002, there were 177 participants contributing 253 message postings in contrast to the decline in 2009 – 2010, which had 139 participants, and 151 message postings.

The second proposition (P2) speculated that as technology develops and society becomes more technology embedded and exposed, a denser and a higher number of participants was to be expected within the online discussion forum. In light of the first proposition, it is equally surprising to note that the anticipated increase in number of participants and the density of the communication ties decreases, relative to when the online network forum first rolled out to the public. Whether this decrease is significant or not statistically remains to be tested. However, it can be conjectured that perhaps the decline in participation *amongst* the participants be attributed to the increase of other online social network forums such as Facebook, Twitter and so on.

In the words of the project manager from NSW Community Builder (who was interviewed to follow up the results of our analysis),

“This is due to the fact that there are a lot lesser visitors to the site now than compared to the early years. This is also probably because everyone now is familiar with other technologies.”

When prompted further whether such technologies specifically refer to Web 2.0 tools, the project manager remarked that it could be, and that

“....it might have something to do with information being a lot more accessible, so whereas you would be asking people for information because you wouldn’t normally be able to find that information on the web back then...now, everything is on a website. You can find everything so easily. Perhaps, people can find it themselves rather than asking other people.”

This remark is consistent with finding from literature which suggests that information may be found from relational sources (such as via discussion boards, usenets, etc.) as well as non-relational sources given the advancement of technology (Zimmer & Henry, 2007).

With regards to centralisation of the communication network structure, the results do suggest some success in the government's objective to achieve a flat, non-bureaucratic structure as a way to encourage C2G, C2C and vice-versa. The low centralisation results indicate that majority of the communication and subsequent discussions did not solely evolve around a particular person (such as a community director) or a collective number of people (e.g. individuals working for a government welfare organization, such as Centrelink in Australia). This suggests that in terms of achieving a decentralized form of social exchange, there is some success in the Australian context. Therefore the first two propositions (P1 – pertaining to number of actors increasing & P2 – pertaining to the density of communication increasing) do not seem to be supported by the results; but the last proposition (P3 – pertaining to decentralisation over time) seems to be supported.

At this point it is useful to consider the role of dispersed virtual communities (e.g. communities of interest such as open source software developers who work together from all over the world) and physically based communities (such as the community of a small suburb that has an online presence) in promoting civic engagement. While both forms of community have potential to increase social capital, physically based communities may be more likely to increase civic engagement because this community is already associated with a civic centre (e.g. town hall) (Blanchard & Horan, 1998). In terms of NSW Community Builders, the project manager likened the definition of a community to a virtual community:

“A community is a group of people who share the same hobbies, culture, the same passion for something, and want to make it better. That's what (NSW) Community Builders was built for – for people to get together, to form and create their own community, and give them a starting point for them to create one or start their own projects.”

It can thus be argued that while NSW Community Builders' OSN may be both virtually and physically based forms of communities, because of its tendency towards a virtual community and that there are other forms of virtual communication technologies beyond a mere discussion board, that we find lack of support for P1 and P2.

CONCLUSION, LIMITATIONS & RESEARCH NEEDS

Despite the growing popularity of online social network sites such as Faceook, MySpace, LinkedIn and Twitter, little has been written about government-sponsored OSN and the effect of the structure of such OSN on citizen engagement in political policy and community building remains little explored. Using theories of social capital and social networks in community building, this research paper explores the role of online social network structure for facilitating collaborative civic engagement in the context of an Australian government-sponsored online discussion forum for community building. In doing so, it has also provided a social network analysis based model for measurement of government and civic engagement on an online social networking platform motivated by theories of social capital and exchange.

Comparing results from the sociocentric network analysis of communication ties between the early years and current year demonstrate that there is no difference in the intensity of communication amongst participants (density) and the tendency for network communications to focus on particular individuals or groups (centralisation). Whether this difference is statistical or not remains to be tested. However, this could also imply that the provision of technological infrastructure alone is not sufficient. Rather, for long-term sustainability, government agencies need to reconsider its strategies for fostering community building, particularly in achieving a better fit between its IT strategy and business strategy.

It remains arguable that OSN of the form of online discussion forms supported and sponsored by government can contribute to civic engagement and community building. However, this research demonstrates that while decentralized structures are useful for the removal of hierarchical and bureaucratic barriers for G2C and C2G communication, results show that the provision of technological infrastructure alone is not sufficient. In particular, the mere deployment and presence of an online discussion forum alone is not sufficient for fostering community building. Rather, for long-term sustainability, government agencies need to reconsider its strategies for fostering community building, particularly in achieving a better fit between its IT strategy and business strategy. For example, it may wish to integrate the features and services offered by other Web 2.0 tools (e.g. Facebook, Twitter, mash ups, etc.) as part of its IT strategy to enable tighter integration with updated social technologies; it may also consider providing personnel support and a dedicated team for developing engaging community projects and forum maintenance.

As with most research, this research has some limitations. Firstly, the sociocentric analysis conducted in the study is purely relational and does not account for other soft data such as reasons for low number of participants or visitors to the forum. In other words, contextual information about the users and the forum was not considered. Secondly, this study was a case study of a single OSN site that is state government-sponsored and an empirical analysis of the OSN structure on communication and interaction patterns among site participants, but not their communication contents. Thirdly, as this study was a preliminary first step in exploring the communication structure of early and contemporary years of the OSN, the conjectures were at best propositions

instead of formal hypotheses. Fourthly, from a methodological standpoint, although the network analysis tool might be a blunt instrument for revealing social connections (i.e. lacking content and richness), it offers a first step in the assessment of whether the online discussion forum is truly successful in its pursuit of community building.

Future research directions will expand the current research's scope to include more rigorous hypothesis testing using statistical measures, a longitudinal analysis of communication and interaction patterns as well as content analysis spanning over the life of the CommunityBuilders forum from 2001 to 2011.

Furthermore, a new set of research questions have opened up and evolved as a result of this study to guide future research: Although it is conjectured that the increase in other social network forums is a possible cause, the 'why' question here is very important. Why was civic engagement and community building not supported in this forum? Was it due to functionality differences? Did members not feel like a community? To what extent are other Web 2.0 tools more effective than the current one for civic engagement?

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